

Sketch and Label your 30 - 60 -90 and 45 - 45 - 90 triangles below:

For problems 1 - 5, sketch each scenario. Solve without a calculator by setting up a trig proportion using the special right triangles above.

1. A damsel is in distress and is being held captive in a tower. Her knight in shining armor is on the ground below with a ladder. When the knight stands 15 feet from the base of the tower and looks up at his precious damsel, the angle of elevation to her window is 60 degrees. How long does the ladder have to be?
2. Suppose you're flying a kite, and it gets caught at the top of the tree. You've let out all 100 feet of string for the kite, and the angle that the string makes with the ground is 45 degrees. Instead of worrying about how to get your kite back, you wonder. "How tall is that tree?"
3. A submarine traveling at a depth of 250 feet dives at an angle of 30° with respect to a line parallel to the water's surface. It travels a horizontal distance of 1500 feet during the dive. What is the depth of the submersible after the dive?
4. A fire department's longest ladder is attached to the top of the truck. The truck is 15 feet tall. You can place the ladder at an angle of 30 degrees. If there is 35 feet between the edge of a building and the street and the ladder just reaches the building at the second floor, how high up is the second floor?

5. Continuing the scenario in question 4, assume each floor is the same height and you can move the truck closer. If under special circumstances you are allowed to use an angle of elevation of 60 degrees, will you be able to reach a person on the 4th floor with the same ladder?

For problems 6 - 8, sketch each scenario. Solve with a calculator by setting up a trig proportion.

6. Brothers Bob and Tom Katz buy a tent that has a center pole 6.25 feet high. If the sides of the tent are supposed to make a 50° angle with the ground, how wide is the tent?

7. Ophelia Payne is walking to her office building which she knows is 150 ft high. The angle to the top of the building from her current location is 6° . How much further does she need to walk?

8. A communications tower is built on top of a building with the following specifications: from a point 200 meters from the base of the building, the angle of elevation to the top of the building is 15.9 degrees and the angle of elevation to the top of the tower is 23.6 degrees. Find the height of the tower.